Take Control & Save

A Cooperative Effort for Energy Efficiency

Associated Electric Cooperative Inc.

2023 Energy Efficiency Program Guide

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ENERGY STAR PARTNER

Take Control & Save

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2023 Rebate Summary

Rebates are not to exceed 50 percent of the total cost.

BONUS SAVINGS

ROOM AIR CONDITIONERS	
	Rebate
ENERGY STAR rated (for new or replacement unit) Limit one (1) per meter	**$50**
ELECTRIC WATER HEATERS	
	Rebate
For electric water heaters that meet DOE standards at time of manufacture. For new construction, the replacement of an existing electric heater that is less than 0.90 efficiency or replacement of a gas water heater. Limit two (2) per meter	**$50**
HEAT PUMP WATER HEATERS	
	Rebate
The energy efficiency rating must meet DOE standards. For new construction, the replacement of an existing electric heater that is less than 0.90 efficiency or replacement of a gas water heater. Limit two (2) per meter	**$500**
ENERGY STAR ADVANCED THERMOSTAT	
	Rebate
Must be an Energy Star rated thermostat. Can be used with any type of heating and cooling system. Limit of up to two (2) per meter. For new construction, or the replacement of an existing non-Energy Star thermostat.	**$50**
C&I VFD's FOR HVAC	
	Rebate
Rebate when installing variable frequency drive motors for HVAC pumps and fans in an existing facility. VFD's are tied to an automated control system and have a true power factor of .90 or greater.	**$50 per brake HP**

Rebates are not to exceed 50 percent of the total cost.

GROUND SOURCE HEAT PUMPS	
Requirements	**Rebate**
ENERGY STAR Plus 2 rated • On new home or building construction • Replacement of electric resistance heat • Replacement of existing natural gas or propane heating system • Replacement of an existing central air conditioner or dual-fuel heat pump • Electric or fossil fuel backup heat will be allowed for ground source heat pumps. **AECI will match dollars 2 for 1 for new loop and indoor unit systems.**	**The total maximum amount is $500 per ton**
For the replacement of the indoor ground source heat pump unit only – no match required	**$150 per ton**
BASEMENT/CRAWLSPACE/SLAB INSULATION REBATES	
Requirements	**Rebate**
This program is a 50/50 cost-shared incentive for cooperative members who are installing insulation in ***conjunction with the installation of a new ground source heat pump***.	**Incentive is up to $500**
AIR SOURCE AND MINI-SPLIT HEAT PUMPS	
Requirements	**Rebate**
ENERGY STAR Plus 2 rated • New home or building construction • Replacement of existing electric resistance heat/ central air conditioning/air source heat pump • Supplemental heat must be controlled by an automatic thermostat	**$150 per ton**

HOME ENERGY AUDITS	
This program is a 50/50 cost-shared incentive for distribution cooperatives.	**Incentive is up to $175**
HOME ENERGY WEATHERIZATION	
This program is a 50/50 cost-shared incentive for cooperative members for weatherization improvements done in conjunction with an approved energy audit.	**Incentive is up to $750 per home - $25,000 for multi-unit complexes**

SMALL C & I, SCHOOL & NON-PROFIT ENERGY AUDITS	
This program is for commercial, school and industrial facilities that have basic energy usage and that use less than 500 kW per month.	**50-50 cost share based on the cost of the audit**

BUSINESS, SCHOOL & NON-PROFIT LIGHTING PROGRAM	
This program is for C&I, schools and agricultural facilities that want to install high-efficiency lighting.	**Incentives for C&I, school & agriculture facilities**

ENERGY EFFICIENCY EDUCATION
A variety of options exist to help you educate your members and employees.

PLEASE NOTE: Rebates are limited to services using 6000 kWh or more per year

The Take Control & Save rebate program is limited to cooperative services that use 6000 or more kilowatt-hours on an annual basis. Eligible services include lake homes, workshops, and barns, etc. For new services, cooperatives may elect to withhold rebate payment for one year to ensure compliance with this requirement. C&I incentives/rebates may be taxable and if greater than $600, should be reported to the IRS by Cooperative as income to recipient on IRS Form 1099-MISC unless member has identified themselves as a corporation or as tax exempt entity.

ENERGY STAR® Rated Room Air Conditioners

Rebate: Associated rebate is **50% up to $50** (Limit one per meter)

Purpose/Concept:

The AECI Take Control & Save Bonus Savings program is offered year-round and is designed to increase the purchase and installation of new, high-efficiency, ENERGY STAR rated individual window or through the wall, room air conditioner units. Used equipment does not qualify for a rebate. Member homeowners are encouraged to replace cooling equipment that is more than ten years old and make a change to ENERGY STAR rated units.

The participating cooperatives will provide rebates to their residential members who purchase and install qualifying new ENERGY STAR rated room air conditioners.

Goal:

The program is implemented by the cooperatives with the common goal of increasing member awareness of saving energy.

Eligibility Criteria

1. Must be a member in good standing of the cooperative
2. Cooperative must verify an ENERGY STAR rated room air conditioning unit is purchased
3. The rebate will apply for the purchase of one new ENERGY STAR rated unit or for the replacement of an existing unit
4. Rebates are available for existing and new homes

Rebate Requirements

1. **Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number**
2. Member must sign the application and submit it to the cooperative along with an original dated sales receipt
3. Cooperative verifies account number, name and address of member
4. Rebate request should be submitted to the cooperative within 90 days of purchase
5. **Limit one (1) rebate** per meter
6. A separate application must be completed for each residence
7. The cooperative reserves the right to conduct random inspections of installations
8. Rebate program is limited to cooperative services that purchase 6,000 or more kilowatt-hours on an annual basis from the cooperative. Eligible services include lake homes, workshops, and barns, etc. For new services, cooperatives may elect to withhold rebate payment for one year to ensure compliance with this requirement.

Note: Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Cooperatives no longer must submit copies of receipts to AECI. Be sure to download the latest forms from the Members Area of www.aeci.org.

Energy Efficient Electric Water Heaters

Rebate: Associated rebate is **50% up to $50** (Limit two per meter)

Purpose/Concept:

The AECI Take Control & Save Bonus Savings program is offered year-round and is designed to increase the purchase and installation of new, high-efficiency electric water heaters that meet or exceed Division of Energy (DOE) standards at the time of manufacture. Used equipment does not qualify for a rebate

Goal:

The program is implemented by the cooperatives with the common goal of increasing member awareness of saving energy.

Eligibility Criteria

1. Must be a member in good standing of the cooperative
2. The energy efficiency rating of the new unit must meet Department of Energy (DOE) standards at the time of manufacture.
3. Available for new construction or replacement of an existing electric water heater.
   a. If the new unit replaces an existing water heater, the efficiency rating of the old unit must be less than 0.9 efficiency.
4. Tankless water heaters are not eligible for this program
5. Gas-to-electric water heater conversions are eligible for this program
6. Rebate applies only to 40 gallon or larger electric water heating units.

Rebate Requirements

1. Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number
2. Member must sign the application and submit it to their cooperative along with an original dated sales receipt
3. Rebate request should be submitted to the cooperative within 90 days of purchase
4. Cooperative verifies account number, name and address of member
5. **Limit two (2) rebates** per meter
6. A separate application must be completed for each residence
7. The cooperative reserves the right to conduct random inspections of installations
8. Rebate program is limited to cooperative services that purchase 6,000 or more kilowatt-hours on an annual basis from the cooperative. Eligible services include lake homes, workshops, and barns, etc. For new services, cooperatives may elect to withhold rebate payment for one year to ensure compliance with this requirement.

Note: Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Cooperatives no longer must submit copies of receipts to AECI. Be sure to download the latest forms from the Members Area of www.aeci.org.

Heat Pump Water Heaters

Rebate: Associated rebate is **50% up to $500** (Limit two per meter)

Purpose/Concept:

The AECI Take Control & Save Bonus Savings program is offered year-round and is designed to increase the purchase and installation of new, heat pump water heaters that meet or exceed Division of Energy (DOE) standards at the time of manufacture. Used equipment does not qualify for a rebate

Goal:

The program is implemented by the cooperatives with the common goal of increasing member awareness of saving energy.

Eligibility Criteria

1. Must be a member in good standing of the cooperative
2. The energy efficiency rating of the new unit must meet Department of Energy (DOE) standards at the time of manufacture.
3. Available for new construction or replacement of an existing gas, or electric water heater.
   b. If the new unit replaces an existing water heater, the efficiency rating of the old unit must be less than 0.9 efficiency.
4. Tankless water heaters are not eligible for this program
5. Rebate applies only to 40 gallon or larger heat pump electric water heating units.

Rebate Requirements

Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number
Member must sign the application and submit it to their cooperative along with an original dated sales receipt

1. Rebate request should be submitted to the cooperative within 90 days of purchase
2. Cooperative verifies account number, name and address of member
3. **Limit two (2) rebates** per meter
4. A separate application must be completed for each residence
5. The cooperative reserves the right to conduct random inspections of installations
6. Rebate program is limited to cooperative services that purchase 6,000 or more kilowatt-hours on an annual basis from the cooperative. Eligible services include lake homes, workshops, and barns, etc. For new services, cooperatives may elect to withhold rebate payment for one year to ensure compliance with this requirement.

Note: Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Cooperatives no longer must submit copies of receipts to AECI. Be sure to download the latest forms from the Members Area of www.aeci.org.

ENERGY STAR® Certified Advanced Thermostat

Rebate: Associated rebate is **50% up to $50** (Limit two per meter)

Purpose/Concept:

The AECI Take Control & Save Bonus Savings program is offered year-round and is designed to increase the purchase and installation of new, ENERGY STAR listed smart thermostats.

The participating cooperatives will provide rebates to their residential members who purchase and install qualifying new ENERGY STAR listed smart thermostats

Goal:

The program is implemented by the cooperatives with the common goal of increasing member awareness of saving energy.

Eligibility Criteria

1. Must be a member in good standing of the cooperative
2. Cooperative must verify an ENERGY STAR listed smart thermostat unit is purchased
3. The rebate will apply for the purchase of up to two new ENERGY STAR listed units, or for the replacement of an existing manual or programmable thermostat
4. Rebates are available for existing and new homes

Rebate Requirements

1. Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number
2. Member must sign the application and submit it to thecooperative along with an original dated sales receipt
3. Cooperative verifies account number, name and address of member
4. Rebate request should be submitted to the cooperative within 90 days of purchase
5. **Limit two (2) rebates** per meter
6. A separate application must be completed for each residence
7. The cooperative reserves the right to conduct random inspections of installations
8. Rebate program is limited to cooperative services that purchase 6,000 or more kilowatt-hours on an annual basis from the cooperative. Eligible services include lake homes, workshops, and barns, etc. For new services, cooperatives may elect to withhold rebate payment for one year to ensure compliance with this requirement.

Note: Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Cooperatives no longer must submit copies of receipts to AECI. Be sure to download the latest forms from the Members Area of www.aeci.org.

Variable Frequency Drives for HVAC pumps & fans

Rebate: **$50** per Brake Horsepower (BHP) of motor driven by VFD

Purpose/Concept:

The AECI Take Control & Save Bonus Savings program is offered year-round and is designed to increase the purchase and installation of new, VFD's for HVAC systems.

Goal:

The purpose of the Commercial & Industrial (C&I) Bonus Savings Program is to allow Electric Cooperatives member systems to promote the value of energy efficiency to their business-members through offering funding for specific energy efficient equipment purchase and installation, when program specifications are met, thereby encouraging Cooperative member-businesses to reduce electric energy use where applicable.

Eligibility Criteria

1. Must be a business member in good standing of the cooperative
2. Rebates are available for existing and new construction
3. Not eligible for replacement of existing VFD's
4. Old motor must be disposed

Rebate Requirements

1. **Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number**
2. Identify the operating hours
3. Identify the application of the VFD: hot water pump, chilled water pump, or HVAC fans
4. Two types of VFD's:
    a. HVAC fans which include: Constant volume, Air foil/backward inlet, Air foil inlet guide vanes, Forward curves, & Forward curved inlet guide vanes
    b. HVAC pumps which include: Chilled water pump, & Hot water pump.
5. Member must submit itemized equipment invoices, rebate application, and manufacturer equipment specifications. To ensure that the equipment installed meets the cooperatives performance standards, these invoices must itemize labor charges, quantity and price of the equipment installed, as well as information regarding the manufacturer and model numbers for all equipment included in the rebate
6. Cooperative verifies account number, name and address of member
7. Rebate request should be submitted to the cooperative within 90 days of purchase
8. The cooperative reserves the right to conduct random inspections of installations

Note: Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Cooperatives no longer must submit copies of receipts to AECI. Be sure to download the latest forms from the Members Area of www.aeci.org.

Heating & Cooling Equipment Rebates

Ground Source Heat Pumps (GSHP)

Purpose/Concept:

The AECI Take Control & Save Home Comfort program is offered year-round and is designed to increase the purchase and installation of new, high-efficiency heat pump systems. Used equipment does not qualify for a rebate

Goal:

The program is implemented by cooperatives with the common goal of increasing member awareness of saving energy.

Rebates:

For ground-source heat pump installations that include the indoor unit and loop, AECI will match $2 for $1 with a maximum of $500 per ton to the cooperative with limits of 50 tons for commercial and 10 tons for residential per facility. Cooperatives may provide an additional rebate to the member.

Note: Cooperative facilities are eligible for this rebate with the same rebate limits as detailed above.

For the replacement of the indoor ground-source heat pump unit only (does not include loop system), a $150 per ton rebate will apply. If the indoor heat pump (compressor) unit is replaced, it must be a gain of 3 EER rating points and meet the Take Control & Save Program requirements. A Manual J calculation is **not** required when replacing indoor unit only.

Specifications for sizing ground-source heat pumps for installation

For distribution systems north of the Missouri River, the ground-source heat pump will be installed with a Delta T of 80. A Manual J calculation will be used to support the Delta T. The electric backup heat must be separated from the ground-source unit with a separate breaker and must be wired to only act as second stage supplemental heat on a two-stage thermostat or as emergency heat. The distribution system must determine if a minimum of R-38 insulation is present in the ceiling and a minimum of R-13 is present in the walls.

For distribution systems south of the Missouri River, a Manual J calculation must be based on using a 70-degree design temperature as the extreme on the heating side. The electric backup heat must be separated from the ground-source unit with a separate breaker and must be wired to only act as second-stage supplemental heat on a two-stage thermostat or as emergency heat. The distribution system must determine if a minimum of R-38 insulation is present in the ceiling and a minimum of R-13 is present in the walls.

Manufactured, double-wide mobile homes and modular homes must meet the minimum insulation standards (R13 walls; R38 ceiling) and be installed on a permanent foundation on property owned by the member. (See item 5 under eligibility criteria.)

Electric backup heat will be allowed for ground-source heat pump units.

Eligibility Criteria

1. Must be a member in good standing of the cooperative (all classes of customers are included)
2. Available for:
   a. New construction - homes and buildings
   b. Replacement of electric resistance heat
   c. Replacement of an existing dual-fuel or ground-source heat pump
   d. Replacement of existing natural gas or propane heating system
3. The heat pump must be an ENERGY STAR Plus 2 rated unit, be installed by a certified dealer and meet the following efficiency standards for rebates:

GEOTHERMAL HEAT PUMP CRITERIA
CURRENT ENERGY STAR Requirements

Installation criteria	Energy Star	TAKE CONTROL & SAVE Minimums
Closed loop, water to air systems	**17.1 EER**	**19.1 EER**
Open loop, water to air systems	**21.1 EER**	**23.1 EER**
Closed loop, water to water systems	**16.1 EER**	**18.1 EER**
Open loop, water to water	**20.1 EER**	**22.1 EER**

The criteria in the chart above applies to single stage models and multi-stage models when using an average of the both the high and low ratings on capacity. See example below.

Multi-Stage Geothermal heat pumps are designed to operate at more than one stage or capacity using technologies such as multiple stage compressors, dual compressors, variable speed compressors, etc. Multi-stage models are more efficient while running at lower capacities but have the capability to supply more heating or cooling using higher capacities when required.

Multi-stage models may be calculated by:

EER = (highest rated capacity EER + lowest rated capacity EER)/2
COP = (highest rated capacity COP + lowest rated capacity COP)/2

4. Fossil fuel back-up heat is allowed provided that the units meet the same sizing and Manual J design criteria as required of GSHP's with electric strips for back-up
5. The home where the ground-source heat pump is installed must be a permanent structure on a permanent foundation and on land owned by the homeowner
6. AECI will not rebate DX (direct expansion) Ground Source Heat Pumps

Rebate Requirements

1. Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number
2. Member must sign the application and submit it to thecooperative along with an original dated sales receipt
3. Rebate request should be submitted to the cooperative within 90 days of purchase
4. A separate application must be completed for each installation site with a limit of one (1) rebate per address. Attach additional sheets for multiple units.
5. Cooperative must verify account number, name and address of member
6. Rebate program is limited to cooperative services that purchase 6,000 or more kilowatt-hours on an annual basis from the cooperative. Eligible services include lake homes, workshops, and barns, etc. For new services, cooperatives may elect to withhold rebate payment for one year to ensure compliance with this requirement.
7. Cooperative must verify a qualified heat pump system has been purchased and installed by a certified dealer. To verify EER, go to the ENERGY STAR website for Geothermal Heat Pumps and select Product Finder. For additional assistance go to the Air-Conditioning, Heating and Refrigeration Institute (AHRI) website, a trade association representing manufacturers of air conditioning, heating and commercial refrigeration equipment. AHRI develops standards for and certifies the performance of many of these products. If you know AHRI's unique identification number assigned to the model/combination and need to know if the GSHP unit is ENERGY STAR qualified go to the - AHRI HVAC look-up directory.

Note: Commercial/Industrial incentives/rebates may be taxable and if greater than $600, should be reported to the IRS by Cooperative as income to recipient on IRS Form 1099-MISC unless member has identified themselves as a corporation or as tax exempt entity.

Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Cooperatives no longer have to submit copies of receipts or the Manual J calculation to AECI. Cooperatives must certify that Manual J calculation has been completed. Be sure to download the latest forms from the Members Area of www.aeci.org.

Basement, Crawlspace or Slab Insulation Rebates
(in conjunction with installation of ground source heat pump)

Rebates: Associated rebate: **50% match up to a cap of $500**

Purpose/Concept:
The Take Control & Save basement, crawlspace or slab insulation rebate is offered year-round and is designed to help cooperative members who are installing a ground source heat pump lower the size of the equipment needed. A properly insulated basement can help reduce energy costs and lower the overall heating load on a home.

Eligibility Criteria
1. Must be a member of the cooperative in good standing (all classes of customers are included)
2. Available to cooperative members who are also installing a new ground source heat pump in their home or business:
   a. New construction - homes
   b. Replacement of electric resistance heat
   c. Replacement of an existing central air conditioner or dual-fuel heat pump

Rebate Requirements
1. Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number
2. Member must sign the application and submit itto the cooperative along with an original dated sales receipt
3. Rebate request should be submitted within 90 days of purchase
4. A separate application must be completed for each installation site with a limit of one (1) rebate per meter. Attach additional sheets for multiple units.
5. Cooperative must verify account number, name and address of member
6. Cooperative must verify a qualified ground source heat pump system has been purchased and installed.
7. Rebate program is limited to cooperative services that purchase 6,000 or more kilowatt-hours on an annual basis from the cooperative. Eligible services include lake homes, workshops, and barns, etc. For new services, cooperatives may elect to withhold rebate payment for one year to ensure compliance with this requirement.
8. Insulation should comply with the current Department of Energy R-Value recommendations. For basement/crawlspace walls in zone 3, insulation must be an R-10. Concrete slab floors should have a minimum of a 1” inch-thick waterproof insulation board between the entire outside edge of the slab and foundation. This insulation board should be placed around the entire foundation and extend in from the perimeter a minimum of 24 inches horizontally under the slab. For best results, insulate the entire floor under the slab. Basement floors less than 2 feet below ground level should be treated as a slab floor. Installation of basement insulation should comply with good building practices, including the installation of any necessary vapor barriers to prevent moisture or mold issues. For additional information and pictorial diagrams, visit the following website: http://www.buildingscience.com/documents/information-sheets/slab-edge-insulation

Note: Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Cooperatives are required to submit copies of receipts for basement/crawlspace/slab-on grade weatherization rebates to AECI. Be sure to download the latest forms from the Members Area of www.aeci.org.

Air Source Heat Pumps and Mini-Split Heat Pumps

Purpose/Concept:

The AECI Take Control & Save Home Comfort program is offered year-round and is designed to increase the purchase and installation of new, high-efficiency heat pump systems. Used equipment does not qualify for rebate.

Rebates: Associated rebate is **$150 per ton,** limited to 50 tons commercial and 10 tons residential per facility.

Eligibility Criteria

1. Must be a member in good standing of the cooperative (all classes of customers are included)
2. Available for:
   a. New construction - homes and buildings
   b. Replacement of electric central air conditioner or electric resistance heat
   c. Replacement of an existing air conditioner or dual-fuel heat pump
3. Supplemental heat must be controlled by an automatic thermostat
4. The heat pump must have an ENERGY STAR Plus 2 rating of 17.0 SEER and be installed by a certified dealer

Rebate Requirements

1. Member must fill in all information requested on the application form including the installation address, mailing address and their cooperative account number
2. Member signs the application and submits it to their cooperative along with an original dated sales receipt within 90 days of purchase
3. A separate application must be completed for each installation site, limit one (1) rebate per meter. Attach additional sheets for multiple units.
4. Cooperative verifies account number, name and address of member
5. Rebate program is limited to cooperative services that purchase 6,000 or more kilowatt-hours on an annual basis from the cooperative. Eligible services include lake homes, workshops, and barns, etc. For new services, cooperatives may elect to withhold rebate payment for one year to ensure compliance with this requirement.
6. Cooperative verifies a qualified heat pump system has been purchased and installed by a certified dealer. To verify SEER, go to the ENERGY STAR website for Air Source Heat Pumps and select Product Finder.

Note: Commercial/Industrial incentives/rebates may be taxable and if greater than $600, should be reported to the IRS by Cooperative as income to recipient on IRS Form 1099-MISC unless member has identified themselves as a corporation or as tax exempt entity.
Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Cooperatives no longer have to submit copies of receipts to AECI. Be sure to download the latest forms from the Members Area of www.aeci.org.

Home Energy Audits and Weatherization Incentives

Purpose:

The AECI Take Control & Save Home Energy Audit and Weatherization Incentive program is offered year-round and is designed to increase the purchase and installation of high-efficiency products in members' homes. The home energy audits and weatherization measures are a multi-faceted program designed to improve the energy efficiency of the member's home.

Goal:

The program is implemented by cooperatives with the common goal of increasing member awareness of saving energy.

Rebates:

Home Energy Audits

1st Home Energy Audit: Associated will rebate 50% of the cost (up to $175.00) for a home energy audit performed in compliance with the requirements listed below which must include a blower door test.

2nd Home Energy Audit: Associated will rebate 50% of the cost (up to $100.00) of a follow-up blower door home energy audit to help verify energy savings from installed weatherization improvements recommended in the first audit.

Home energy audits are available to all distribution system members regardless of the type of heat found in the home.

Weatherization Incentive:

Cooperative members are eligible for an incentive of up to 50% of the cost, with a cap of $750, for the corrective actions taken after the first audit has been performed. A weatherization rebate form is located on the Members Area of www.aeci.org. Corrective measures include such items as labor and materials for insulation, building shell sealing, and interior duct sealing/insulation. **Costs for installation or repair of HVAC equipment or the purchase of appliances are not eligible for a weatherization incentive.**

Cooperatives have the option to offer to members a 2nd energy audit after energy efficient measures have been implemented on a 50-50 cost-shared basis with AECI to verify energy savings.

Eligibility Criteria

1. Must be a member in good standing of the cooperative
2. Audits are available for new or existing homes
   (On new homes, it is recommended that the audit take place after the home is sealed and before sheet rock and insulation have been installed)
3. A separate audit form must be completed for each installation site
4. Must comply with the Home Audit Measure Procedures outlined below
5. Multiple occupancy (apartments, duplexes, dormitories) buildings are eligible for a weatherization rebate on a single structure basis, (not a single unit basis) up to a maximum of $25,000 per year per member. One cost-shared audit on a single unit can be paid to the co-op to determine base-line energy improvements recommended for all units. The building owner is eligible for the matching weatherization rebate (up to $750/unit). (effective July 1, 2010)

Rebate Requirements

1. Member/auditor must fill in all information requested on the AECI Residential Energy Audit 5-page form located at the Members Area of www.aeci.org.
2. Member/auditor must submit the form to local cooperative
3. Cooperative must verify account number, name and address of member
4. Rebate program is limited to cooperative services that purchase 6,000 or more kilowatt-hours on an annual basis from the cooperative. Eligible services include lake homes, workshops, and barns, etc. For new services, cooperatives may elect to withhold rebate payment for one year to ensure compliance with this requirement.

Home Audit Measure Procedure

A 5-page audit form is posted at the Members Area of www.aeci.org. that contains the basic data to be collected during the home energy audit.

The energy audit will consist of the following:

1. A blower door test which pressurizes the building to locate places of air leakage and energy loss
2. Inspection of rim joists, windows, doors, recessed lighting, electrical outlets and switches for air leaks
3. Documentation of all air leaks as candidates for sealing
4. A check of the heating/cooling system filter
5. A check of the heating/cooling system ductwork for air leaks, if accessible
6. A check of the temperature setting on the water heater. (Recommended temperature setting is a range of 120 –140 degrees. If an Energy Star rated dishwasher is not present, the upper end of the range is recommended)
7. Installation of an AECI provided hot water pipe wrap from the top of the water heater up to 10’ if accessible
8. Installation of a low-flow faucet aerator with the owner’s permission only
9. Inspection of the attic and wall insulation - determine if any additional insulation is needed
10. Inspection of crawl space and/or basement, if present, for any energy efficiency opportunities.
11. Determination of the presence of LEDs. Install, with permission of the homeowner, AECI-provided LEDs from Energy Efficiency Weatherization Kit.

Energy Efficient Weatherization Kits

AECI will supply an energy efficiency weatherization kit to cooperatives to provide to their members in conjunction with an energy audit. The energy efficiency kit will contain a variety of items designed to improve the energy efficiency of the home.

How to Order Weatherization Kits

1. The distribution cooperative can place orders for the weatherization kits by contacting AECI Member Energy Services Manager by phone or email.
2. Please include your Cooperative name, your name, shipping address and number of kits requested when ordering.
3. Kits are to be ordered in minimum increments of 24.

The kits will be shipped directly to the distribution cooperative from the supplier.

In the event that the distribution cooperative performs an energy audit that does not include a blower door test, AECI will provide a weatherization kit to the distribution cooperative provided that the rest of the requirements of the AECI energy audit are performed. Weatherization kits will be available for sale to the distribution system at AECI’s cost if the distribution systems would like to make them available to their members without the energy audit.

To be eligible for this program, distribution cooperatives must comply with the Home Energy Audit Procedure. The distribution system may either perform the energy audit with their staff or contract with a vendor to provide the service**.** AECI recommends that all cooperative employees and contractors performing the energy audits be certified by the Building Performance Institute (B.P.I.). Community action agencies are recommended by AECI to provide this service. If the local community action agency is unable to perform the audit, the distribution system may call a community action agency in an adjoining territory.

If the distribution cooperative wishes to use a community action agency to perform the audit, they should directly contact the agency to perform the work. The distribution cooperative will be responsible for providing the weatherization kits to the community action agency. The agency will perform the work and submit an invoice to AECI for payment. AECI will then bill the distribution cooperative for its share of the cost.

If the distribution cooperative performs the audit, the cooperative will submit an invoice to AECI for the reimbursement of AECI's portion of the energy audit cost. A copy of the energy audit with the address where the audit took place will accompany the invoice.

Upon the completion of the home energy audit, the distribution cooperative will then provide the customer with a list of contractors that can complete the work recommended in the audit. The customer, upon completing the work, will provide the distribution cooperative with invoices documenting the work. The distribution cooperative should decide if an inspection should be made to determine if the work has been completed.
All inquiries under this program measure should be directed to the AECI member energy services manager.

Note: Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Cooperatives are required to submit copies of receipts for weatherization rebates to AECI. Be sure to download the latest forms from the Members Area of www.aeci.org.

Small Commercial, School & Industrial Energy Audits

Purpose/Concept:

This program provides energy audits for industrial members, commercial businesses, local government units, community colleges, K-12 school systems, and non-profit organizations typically with less than **500 kW** demand that have potential for energy efficiency savings. AECI studies show that targeted categories such as lighting, motor replacement and HVAC applications are candidates for energy savings.

Requesting a Small Commercial, School & Industrial (CS&I) Energy Audits From AECI

Contact AECI Member Energy Services Manager to determine an auditor that is acceptable to both parties to perform the audit. Member and/or Cooperative must complete an Energy Audit Cost Proposal worksheet to receive cost estimate for the audit from an approved auditor. The auditor will need to have the following information from the cooperative/member in order to provide a cost estimate:

1. A twelve (12) month history of energy usage; including kWh, therms, and cost.
2. General information about the member such as contact name, title, company name, address, type of business/operation
3. Business/operation square footage to be audited
4. Year facility was built
5. Main function of facility (office, retail, manufacturing, etc.)

AECI will coordinate with the auditor and the cooperative on the scheduling of the audit. Auditor will provide a proposed date, cooperative will contact its member to verify date and schedule the audit. The energy audit can encompass several hours for gathering data. The cooperative is responsible for all contact with the member.

Small commercial and industrial customers must pay an initial 25% of the audit fee directly to the cooperative prior to the audit. This fee is reimbursable from the cooperative when one or more of the recommended measures are implemented within twelve (12) months of the audit date. Implemented measures must save 10% of total estimated annual electric energy savings (kWh) as recommended by the auditor. This is intended to encourage customers to install recommended energy efficient measures. **School districts are not subject to the 25% pre-audit fee.**

Auditor will invoice AECI for 100% of basic audit costs. AECI will then invoice the cooperative for its 50% of the cost share. Optional items selected by member will be paid for directly to auditor by the member.

Energy audit procedure

1. The auditor will meet with the cooperative and member key personnel for preliminary interview to identify the audit scope.
2. The auditor will conduct a walk-through of the facility to observe equipment, processes, and to identify energy management opportunities.
3. After the walk-through for basic audits, the auditor will conduct a post audit interview with member key personnel to discuss audit findings and share energy management opportunities identified.
4. For more extensive audits, a follow-up meeting, by phone, may be scheduled with the auditor, cooperative and member to review the results and recommendations. If it is necessary for the auditor to make a return trip to share energy management opportunities with member or a governing board, additional travel expenses for 2nd trip will be incurred.

Note: Expenses for travel can be less when it is feasible to combine more than one audit in a general area with other nearby members or with other neighboring cooperatives.

Cost-Shared Fees:

There is no limit on the number of cost-shared Small CS&I audits a cooperative can request per year. AECI will invoice cooperative for 50% of audit fee, cooperative is responsible for collecting cost-share from member. Audits are conducted to identify energy management opportunities and will conform to the audit description/scope of work outline to be eligible for the cost-share. The Energy Audit Cost Proposal worksheet is available on the *Take Control & Save*® area of the Members Area of www.aeci.org.

Auditor credentials

All audits must conform to the established program energy guidelines and be performed by an experienced, approved Certified Energy Manager (CEM) to qualify for the 50/50 cost-share. All auditors are independent contractors and are required to carry insurance coverage in accordance with all statutory requirements.

Reporting

All audit reports will be submitted to AECI and will become part of a database at AECI for monitoring purposes.

Based on recommendations from the energy auditor, member may qualify for rebates from their local cooperative for qualifying TC&S Programs including Geothermal Heat Pump Rebates and the Business Lighting Program.

Business Lighting Program

Purpose/Concept:

To provide commercial, industrial and agricultural cooperative businesses and school systems a high-efficiency lighting rebate program. Cooperative members may have a mixture of existing lighting systems that offer a high potential for energy efficient lighting replacements. By installing new high-efficiency lighting, these members can lower their operating and maintenance costs, reduce cooling loads and enhance lighting levels.

An incentive rebate will be provided to C&I, schools and agriculture customers who reduce their lighting energy usage by installing **new, qualified energy efficient lighting fixtures and bulbs**. Rebates dollars are for lighting fixtures and bulbs, not for the labor to install or the miscellaneous equipment needed for installation.

Eligible new lighting equipment includes:

- Fluorescent T-5 and T-8 lighting systems with electronic ballasts
- 2-piece compact fluorescent bulbs and fixtures (screw in bulbs are not eligible)
- Light emitting diodes (LED) bulbs and fixtures
- LED exit signs
- Other technologies listed in the new lighting rebate tables

Rebate amounts are based on kilowatt-hours saved and should be calculated using the Business Lighting Rebate Calculator on the Members Area of www.aeci.org. The calculator cannot be downloaded and is only available to member cooperatives.

Eligibility Criteria

1. Must be a member of the cooperative (only commercial/industrial classes of customers are included)
2. A separate application form must be completed for each installation site
3. Only applicants that have greater than **10 bulbs** or fixtures qualify
4. The maximum rebate for each member is $30,000 per year. Multiple schools in a district can receive a lighting rebate, up to $30,000. For example, an elementary and a high school located in the same school district can each receive up to $30,000 for a lighting rebate. Beginning 07/01/14, schools are subject to the same $30,000 cap as all other members.

Note: Co-op facilities are eligible to participate in the lighting program and receive rebates.

Rebate Requirements:

1. Member will contact the cooperative to discuss the program and obtain the lighting rebate application
2. Using the lighting program application and lighting tables, a walk through is conducted to verify existing lighting which is recorded on the application along with information on the member's business. The walk through may be performed by cooperative staff, a trusted vendor, or the member. (There is no fee or payment from AECI for this service)
3. Members and/or their selected lighting vendor will complete the new lighting section of the application.
4. The member will send the completed application to the cooperative to verify calculations, estimate energy savings and receive approval for member to purchase lighting fixtures/bulbs.
5. When the approved lighting has been installed, the member will send a copy of the application, specification sheets (cut sheets) and receipts to the cooperative for reimbursement.
6. The cooperative will perform a walk-through to verify new lighting installation
7. The cooperative will send an invoice, copy of application from Business Lighting Calculator and receipts to AECI for approved rebate amount.
8. Member and/or their selected vendor who installs the new lighting is responsible for appropriate disposal of replaced fixtures/bulbs.

Note: Lighting contractor assistance

If the cooperative needs assistance when performing the Business Lighting member walk through audits, a list of companies is available regionally or statewide to assist. See link with contact email and phone numbers at the Members Area of www.aeci.org.

Note:
Commercial/Industrial incentives/rebates may be taxable and if greater than $600, should be reported to the IRS by Cooperative as income to recipient on IRS Form 1099-MISC unless they have identified themselves as a corporation or as tax exempt entity.

Rebate forms not completely filled out will be returned to the cooperative without reimbursement. Cooperatives are required to submit copies of receipts for business lighting rebates to AECI. Be sure to download the latest forms from the Members Area of www.aeci.org.

Advertising, Marketing & Promotion

Energy efficiency advertising:

Associated Electric Cooperative will periodically place advertising for the Take Control & Save program measures, along with energy efficiency in general, in the statewide publications. Distribution cooperatives are encouraged to advertise their specific programs on energy efficiency in conjunction with the Associated advertising buys. A media plan calendar that lists location of these messages has been developed and can be found on the Members Area of www.aeci.org.

Material development:

Associated designs and develops materials for use by the distribution cooperatives for the purpose of promoting the Take Control & Save program. Cooperatives have access to the various materials through the Members Area of www.aeci.org for customized printing using their logos.

Rebate template forms:

Fillable PDF templates for the rebate/incentive forms reside on the Members Area of www.aeci.org. The distribution systems can download these forms to print or to link to their cooperative websites. The forms automatically download the cooperative name, logo and address.

If you do not have login credentials for the Members' Area, contact the member energy services manager.

Types of promotional materials available:

- Radio/newspaper ads
- Promotional elements included for advertising in target publications, posters, appliance brochures, bill inserts
- Information for company newsletters and special media events
- Display materials for handouts at annual meetings, fairs and home shows

Energy Efficiency Educational Seminars

AECI will work with the distribution cooperatives to help educate their employees and members about energy efficiency.

Take Control & Save Booth

Cooperatives can schedule with AECI member energy services manager to use (and/or assist in working the booth, depending on availability) the TC&S booth at their annual member meetings, home shows, and/or contractor association events.

Advertising & Promotional Materials

AECI has available a variety of materials to promote TC&S. These materials are listed in this guide and are available to member cooperatives for download and customization from the TC&S website.

Educational Seminars

AECI will help the cooperatives develop an energy efficiency seminar to promote the “Take Control & Save” program. The following is how the seminars can be implemented:

1. Contact member energy services manager to discuss current options and dates available
2. AECI may be able to cover and/or assist with some of the expenses for the program
3. Examples of some options available:
    - Employee program training (on-site or video-conference) 1-day basic energy efficiency training and/or half-day program specific training
    - 3-Day Basic Energy Home Energy Auditor Training (done annually on a regional basis, based on demand)
    - On-site Business Lighting Training

If you have other ideas or needs for educational seminars, please contact Member Energy Services Manager.

Attachment I

GLOSSARY of TERMS

Air-handling unit (AHU) - Equipment used to distribute conditioned air to a space. Includes heating and cooling coils, fans, ducts, and filters.

Air-source heat pump mini-split system - Mini-split heat pumps are a good equipment choice for home additions, or selective area cooling, such as one floor or wing of a home. The advantages of a mini-split heat pump system over other types of cooling equipment is that it provides cooling in homes that do not have air ducts

Air-source heat pump split systems - Split cooling systems that have equipment installed both inside and outside the home. In a split system, the condenser or heat pump is installed outside the home, an air handler is installed inside the home. The indoor and outdoor components of a split-system are connected by refrigeration pipes and a low-voltage electrical wire. Cold air is distributed through a duct system inside to each room in the home.

Air-source heat pump single packaged unit - Self-contained cooling systems sit outside the home on the ground or on the roof and all components are contained internally in a single unit. The self-contained units use a duct system to distribute cold air throughout the home

Air side systems - Equipment used to heat, cool, and transport air within building HVAC systems.

ARI - Air-Conditioning and Refrigeration Institute.

ASHRAE - American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.

ASME - American Society of Mechanical Engineers.

Back-up heating systems – a reserve heating source in addition to the primary unit. The reserve heating source could be electric or propane or natural gas.

Balancing - Process of measuring and adjusting equipment to obtain desired flows. Applies to both air side and water side systems.

Ballast - Power-regulating device that modifies input voltage and controls current to provide the electrical conditions necessary to start and operate gaseous discharge lamps.

Blower door - A device used by energy auditors to pressurize a building to locate places of air leakage and energy loss.

Boiler - Pressure vessel designed to transfer heat (produced by combustion) or electric resistance to a fluid. In most boilers, the fluid is water in the form of liquid or steam.

British thermal unit (Btu) - A unit of energy equivalent to the amount of heat required to raise the temperature of 1 pound of water 1 degree Fahrenheit.

Building Performance Institute (BPI) - Provides training, certification, accreditation, and quality assurance programs for building performance.

Calibration - Process of adjusting equipment to ensure that operation is within design parameters.

Carbon dioxide - Colorless, odorless, incombustible gas formed during respiration, combustion, and organic decomposition. Increasing amounts of carbon dioxide in the atmosphere are believed to contribute to the global warming phenomenon.

Carbon monoxide - Colorless, odorless, poisonous gas formed during incomplete combustion of fuel.

Cellulose Insulation - A type of insulation composed of waste newspaper, cardboard, or other forms of waste paper.

Central plant - Centrally located equipment that satisfies a building's cooling and heating loads.

CERCLA Comprehensive Environmental Response, Compensation and Liability Act -(1980) an EPA regulation. Also known as the Superfund law.

cfm - Cubic feet per minute.

Chiller - Mechanical device that generates cold liquid, which is circulated through cooling coils to cool the air supplied to a building.

Chlorofluorocarbons (CFCs) - Chemical compounds consisting of carbon, hydrogen, chlorine, and fluorine, once used widely as aerosol propellants and refrigerants. Believed to deplete the atmospheric ozone layer.

Coefficient of performance (COP) - A measure of efficiency in which a higher value designates a more efficient system. example, chiller efficiency measured in Btu output (cooling) divided by Btu input (electric power), measured at full or part load.

Coil, condenser - A heat exchanger used to condense refrigerant from a gas to a liquid.

Coil, cooling - Heat exchanger used to cool air under forced convection with or without dehumidification. May consist of a single coil section or several coil sections assembled into a bank.

Coil, fan - A device that combines a heat exchanger and a fan in a single unit that conditions air by forced convection.

Coil, heating - Heat exchanger that heats air under forced convection. May consist of a single coil section or several coil sections assembled into a bank.

Color rendering index (CRI) - A measure ranging from 0 to 100 of the accuracy with which a light source renders different colors in comparison to natural light, which has a measure of 100.

Combustion air - Air that supplies the oxygen required to burn fuel.

Commissioning - The quality assurance process that ensures design intent is met for new facilities or major rehabilitation.

Compact fluorescent light (CFL) – A smaller version of standard fluorescent lamps which can directly replace standard incandescent lights. These lights consist of a gas filled tube, and a magnetic or electronic ballast.

Condenser - Heat exchanger in a refrigeration system that expels building heat absorbed in the evaporator.

Conditioned air - Air that serves a space and that has had its temperature and/or humidity altered to meet design specifications.

Constant volume (CAV, constant air volume) - Type of air-handling system that supplies the conditioned space at a constant air flow and modulates heating and cooling by varying the air temperature.

Controls - An instrument or set of instructions for operating or regulating building systems.

Control, pneumatic - A control that utilizes air pressure to vary equipment operation.

Control, set back - The practice of reducing the thermostat set point during unoccupied times.

Cooling tower - Device that dissipates heat from water-cooled systems through a combination of heat and mass transfer, whereby the water to be cooled is distributed in the tower and exposed to circulated ambient air.

Cycling - The non-continuous operation of equipment.

Dampers - Single- or multiple-blade devices, either manually or automatically opened or closed, that control the flow of air.

Deadband - A setting in the lighting control that provides a time delay, signaling the lights to switch off only if the light level is somewhat above the setting, or switch on only if the level is somewhat below the setting.

Di (2-ethylhexyl) phthalate (DEHP) – An insulator used to replace PCBs in ballast capacitors starting in 1979. DEHP is listed as a hazardous waste in its pure form, but, according to RCRA, it is no longer considered hazardous. Once used in a lighting ballast.

Delta T – Design temperature for a heating and/or cooling system calculated by determining the maximum difference in temperature between the inside (conditioned) and outside temperature as figured in degrees Fahrenheit.

Demand charges - Fees levied by a utility company for electric demand.

Demand, electric - Electrical power delivered to a system at a given time or averaged over a designated period. Expressed in kilowatts (kW).

Demand ventilation - Method of controlling the amount of outdoor air intake based on carbon dioxide levels in a space.

Desiccant - A material that absorbs moisture from its surrounding environment.

Direct expansion system - Cooling system in which the refrigerant runs in the cooling coil to cool the air directly; that is, there is no water loop between the refrigerant and the air to be cooled.

Domestic hot water - All hot water consumed in a building that is used for purposes other than heating a space.

Double-wide home – a manufactured home which is twenty feet or more wide and is towed to the site in two separate units. Units are then joined together on the site.

Downsizing - Process of reducing the size (capacity) of equipment so that it operates efficiently at design load conditions.

Diffuser, HVAC - A device that distributes conditioned air to a space.

Diffuser, lighting - A device that distributes light produced by lamps into a space.

Ductwork - The distribution system for air in HVAC systems. It is usually made of sheet metal or fiberglass

Energy Efficiency Ratio (EER) - Cooling capacity (Btu/hr) divided by total input power (watts) requirement.

Efficacy - The ratio of lamp lumen output to total lamp power input expressed in lumens per watt.

Efficiency - Ratio of power output to input.

Energy audit - A survey that shows how much energy you use in your house or apartment. It will help you find ways to use less energy. Would also include a blower door test and an inspection of the building envelope and ductwork for air leaks and an inspection of the heating and cooling equipment for operating efficiency.

Energy management system (EMS) - The control system that monitors the environment and energy usage in a building and alters equipment operation to conserve energy while providing occupant comfort.

ENERGY STAR rated - EPA's trademark symbolizing excellence in energy efficiency.

Envelope, building - The outer shell of a building, including walls, roof, windows, and doors.

Evaporator - Heat exchanger in a refrigeration system that absorbs heat from chilled water or building air, thus reducing the supply temperature.

Exhaust air - Air removed from a building and not reused.

Fans AHU - See air-handling unit.

Fan, cooling tower - Fans that are used to draw air through a cooling tower to carry away water vapor.

Foam (insulation) - A high R-value insulation product usually made from urethane that can be injected into wall cavities, or sprayed onto roofs or floors, where it expands and sets up quickly.

Footcandle (fc) - Unit of luminance equal to 1 lumen per square foot.

Fouling - The buildup of a film that reduces heat transfer.

Foundation - The supportive structure of a building.

Gasket - Material used to seal a joint against leakage.

Glazing - Glass set or made to be set in frames.

Glazing system - A configuration of materials with a transparent or translucent element designed to admit sunlight.

Gallons per minute (GPM) - A measure of water flow rate.

Geothermal heat pump or ground source heat pump - A type of heat pump that uses the ground, ground water, or ponds as a heat source and heat sink, rather than outside air. Ground or water temperatures are more constant - warmer in winter and cooler in summer than air temperatures. Geothermal heat pumps operate more efficiently than "conventional" or "air source" heat pumps.

Heat exchanger - A device that transfers heat from one fluid to another.

Heat-exchange area - Area where heat is transferred from one medium to another.

Heat gain - The rate at which heat enters or is generated within a space at a given instant.

Heat, latent - The heat required to change the state of matter from a liquid to gas or gas to liquid.

Heat pump – A device for transferring heat from a substance or space at one temperature to another at a higher temperature. It consists of a compressor, a condenser, a throttle or expansion valve, an evaporator, and a working fluid (refrigerant). A heat pump is a reversible system and is commonly used both to heat and to cool buildings.

Heat, sensible - The heat required to change temperature without changing state of matter. This temperature change can occur by exposure to radiation, friction between two objects, chemical reaction, or contact with a hotter object.

Heating and Cooling AHU - See air-handling unit.

High-intensity discharge (HID) - A type of electrical lamp which produces light by means of an electric arc between tungsten electrodes housed inside a translucent or transparent fused quartz or fused alumina arc tube.

Horsepower (HP) - A unit of mechanical power.

Humidistat - A device that responds to humidity changes and controls equipment by seeking a setpoint.

HVAC - Heating, ventilating, and air-conditioning.

IAQ - Indoor air quality.

IEEE - Institute of Electrical and Electronic Engineers.

IES - Illuminating Engineering Society.

Illuminance - Commonly called light level, the light intensity arriving on a surface measured in foot-candles.

Impeller - The rotating element of a fan or pump used to circulate the air or water.

Infiltration - Air that leaks into a building through the building shell.

Insulation - Materials that prevent or slow down the movement of heat.

Internal rate of return (IRR) - Compound interest rate at which the total discounted benefits equal total discounted costs for a particular investment.

Kilowatt (kW) - Unit of power equal to 1,000 watts.

Kilowatt-hour (kWh) - Unit of electric consumption equal to the work done by 1 kilowatt acting for 1 hour.

Lighting ballast - Power-regulating device that modifies input voltage and controls current to provide the electrical conditions necessary to start and operate gaseous discharge lamps.

Load - The demand upon the operating resources of a system. In the case of energy loads in buildings, the word generally refers to heating, cooling, and electrical (or demand) loads.

Load, cooling - Cooling (typically measured in Btu/hr or tons) required to maintain an indoor design temperature.

Lumen - Unit measurement of the rate at which a light source produces light per unit time.

Luminaire - Complete lighting unit, consisting of one or more lamps together with a housing, the optical components to distribute the light from the lamps, and the electrical components (ballast, starters, etc.) necessary to operate the lamps.

Luminance - Commonly referred to as brightness, the light leaving a surface measured in foot lamberts. It considers both illuminance on the surface and reflectance of the surface.

Luminance ratio - The ratio between the luminance of anv two areas in the visual field. This is a measure of the uniformity of luminance.

Manual J - The standard method for calculating residential cooling loads developed by the Air-Conditioning and Refrigeration Institute (ARI) and the Air Conditioning Contractors of America (ACCA) based largely on the American Society of Heating, Refrigeration, and Air-Conditioning Engineer's (ASHRAE) "Handbook of Fundamentals."

Maintenance - An ongoing process to ensure equipment operates at peak performance.

Meter - A device used to measure and display or record data

Nitrogen oxides - Chemical compounds that contain nitrogen and oxygen. They react with volatile organic compounds in the presence of heat and sunlight to form ozone and are a major precursor to acid rain.

Occupancy sensor - A device that detects heat (passive infrared) or a shift in the frequency of reflected ultrasonic sound waves, to control operation of lights or equipment accordingly.

Off-peak - Refers to a utility rate schedule that designates the time of day when energy and demand costs are typically less expensive.

On-peak - Refers to a utility rate schedule that designates the time of day when energy and demand costs are typically more expensive.

Packaged unit - A self-contained HVAC unit that provides heating and/or cooling to a building space.

Packaged Terminal Air Conditioner (PTAC) – A type of self-contained heating and air conditioning system commonly found in hotels and apartment buildings. Many are designed to go through a wall, having vents and heat sinks both inside and outside. Most commonly used in hotel/motel rooms but are also perfect for offices, sunrooms, room additions, and garages

Part-load – A condition when equipment operates at less than full capacity to meet the demand placed upon it.

Part-load conditions - Time when equipment is operating at less than design loads; represents the majority of the time equipment is operating.

Part-load performance - Equipment efficiency at less than full capacity.

Parts per million (PPM) - A unit of concentration

Payback, simple - Also known as payback. Measurement of the elapsed time between an initial investment and the point at which accumulated savings are sufficient to offset the initial investment.

Peak (cooling) load - Maximum cooling required to maintain an indoor design temperature under the most adverse summertime outdoor air conditions.

Photocell - A device that responds electrically to the presence of light.

Polychlorinated biphenyl (PCB) - A substance used as an insulator in the capacitor of fluorescent and HID magnetic ballasts prior to 1970. PCBs have been labeled as carcinogenic and can cause skin, liver, and reproductive disorders.

Power factor - Ratio of real power to total apparent power.

Power quality - The degree to which voltage and current wave forms conform to a sinusoidal shape and are in synchronous phase with one another. Poor power quality can have negative impacts on electrical equipment.

Pressure drop - The loss in pressure experienced by flowing water or air due to friction and obstructions.

Pump, chilled-water - Device that circulates chilled water.

Pump, condenser-water - Device that circulates condenser water.

Radiator - Device that provides warmth to a space through radiant or convective heat provided by either steam or hot water.

Recommissioning - Recommissioning ensures system functionality. It is an inclusive and systematic process intended not only to optimize how equipment and systems operate, but also to optimize how the systems function together.

Reflector - A device installed in luminaires used to direct light from a source via specular or diffuse reflection.

Refrigerant - Substance, such as CFCs, HCFCs, HFCs, air, ammonia, water, or carbon dioxide, used to provide cooling by evaporation and condensation.

Reset, chilled water - The practice of increasing chilled water temperature to obtain higher chiller efficiency.

Reset, condenser water - The practice of decreasing condenser water temperature to obtain higher chiller efficiency.

Resource Conservation and Recovery Act (RCRA) - an EPA Regulation.

Rightsizing - The process of correctly sizing equipment to the peak load.

Room air conditioner – an air conditioning unit that is installed in a window.

Roof curb - A raised and reinforced area on a roof for mounting equipment.

Rooftop unit - Air-handling equipment such as packaged units located on the roof.

Seasonal energy-efficiency ratio (SEER) - Cooling capacity (Btu/hr) divided by total input power (watts) requirement where both are seasonal averages.

Scaling - See fouling.

Schedule - A control sequence that turns equipment on and off.

Setpoint - Desired temperature, humidity, or pressure in a space, duct, etc.

Sheave - (Pronounced shiv.) Pulley.

Shell, building - See envelope, building.

Space - The distinct area to which conditioned air is delivered.

Steam trap - A device that separates air and condensed water from steam.

Strainer screen - Filtering device used in water side systems to protect equipment from dirt, rust, and other particles.

Sulfur dioxide - A heavy, colorless, pungent air pollutant formed primarily by the combustion of fossil fuels such as coal. It is a respiratory irritant and a precursor to the formation of acid rain.

Tax Credit – A dollar for dollar reduction of taxes owed, calculated after determining the amount of taxes that you have to pay.

Tax Deduction – Reduces the amount of you income considered taxable by the IRS.

Testing, adjusting, and balancing (TAB) - The process of adjusting HVAC system components to supply air and water flows at design or revised specifications.

Thermostat - A device that responds to temperature changes and controls equipment by seeking a set point accordingly.

Timeclock - The control device used to turn equipment on and off at set times of the day.

Ton - Unit of cooling capacity equal to 12,000 Btu/hr.

Transformer - A device that changes the incoming line voltage, usually to a standard level, so that it may be used to operate electrical equipment in a building.

Tubes, condenser - Heat exchanger tubes through which condenser water is pumped to allow heat transfer between the condenser water and the refrigerant.

Tubes, evaporator - Heat exchanger tubes through which chilled water is pumped to allow heat transfer between the chilled water and the refrigerant.

Tune-up, building - The purposeful sequence of maintenance and operational improvements, undertaken at a specific point in time, designed to reduce energy use, heating loads, and cooling loads of existing facilities.

Variable air volume (VAV) - A type of air-handling system that provides air at a constant temperature and varies the air quantity to each zone to match the variation in room load.

Variable frequency drive (VSD) - A device used to adjust the speed of an AC motor to match load requirements.

Visual comfort probability (VCP) - A rating given to lighting systems expressed as the percentage of people who will find light output acceptable in terms of glare due to direct light from luminaires.

Voltage, volts - International system unit of electric potential or the amount of electrical flow, also referred to as electromotive force.

Water side systems - Equipment used to heat, cool, and transport water to building HVAC systems.

W/sf - Watts per square foot.